

DOCUMENT RESUME

ED 200 373

RC 012 612

AUTHOR Edington, Everett D.; Keaton, Laurie
TITLE Television as a Means of Training Rural Young-Adult Apprentices in Solar Energy.
PUB DATE Mar 81
NOTE 11p.; Paper presented at the Conference of the "Youth Sociology" Research Committee of the International Sociological Association (Fredeburg, Federal Republic of Germany, March 1981).
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Apprenticeships; Audiovisual Instruction; Instructional Materials; *Intermode Differences; Learning Modalities; Postsecondary Education; Program Development; *Program Effectiveness; *Rural Education; Sheet Metal Workers; *Solar Radiation; Student Attitude; Teaching Methods; *Telecourses; *Young Adults
IDENTIFIERS *New Mexico

ABSTRACT

Using television as a means of delivery for an educational program in rural areas and looking at the media preferences of young adults, this study was conducted in a non-metropolitan area of northwestern New Mexico to examine the effectiveness of television and videotape to provide basic principles of solar energy to 15 young apprentices in a sheet metal program. Pretests were given, followed by classroom study of printed materials, re-testing, and home study. Five audio visual segments were shown in two subsequent meetings, and the final comprehensive test administered. Information from a questionnaire was used to obtain group means, variances, and standard deviations, and minimum and maximum scores were obtained from aptitude tests, pretests, posttests, and final tests. Learning gains were shown by almost all, and the apprentices scored a pretest average of 14.73, a posttest of 22.07, and a learning gain of 7.33. Findings revealed that learning by preferred medium (print/audiovisual) does not appear to lead to greater learning gains, but significant learning can take place using audiovisual or printed materials. Therefore, television is recommended as an effective means of providing instructional programs for young adults who are long distances from centers of instruction. (JD)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED200373

TELEVISION AS A MEANS OF TRAINING
RURAL YOUNG-ADULT APPRENTICES IN SOLAR ENERGY

by

Dr. Everett D. Edington

Director

Educational Resources Information Center
Clearinghouse on Rural Education and Small Schools
New Mexico State University

Professor

Educational Management and Development
College of Education
New Mexico State University

and

Laurie Keaton

College of William and Mary

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

Everett D.
Edington

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

March 1981

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRO-
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIGIN-
ATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRESENT
OFFICIAL NATIONAL INSTITUTE OF
EDUCATION POSITION OR POLICY.

Paper presented at the 1981 Conference of the "Youth Sociology" Research
Committee of the International Sociological Association (ISA) held at the
Deutsche Landjugend-Akademie, Fredeburg, Federal Republic of Germany.

RC 012612

TELEVISION AS A MEANS OF TRAINING
RURAL YOUNG-ADULT APPRENTICES IN SOLAR ENERGY

by: Dr. Everett D. Edington
New Mexico State University

Laurie Keaton
College of William and Mary

A major weakness in the educational system is providing programs to rural young adults. This is especially true for those who are out of school and may or may not be beginning apprentice programs in their various occupations. With the advent of new technology there is more and more opportunity for delivering educational programs to the more isolated young adults throughout the world.

The major purpose of this study was to examine the feasibility of using television and videotape as a means of delivering educational programs to apprentices in sheet metal programs. The geographic area studied was a non-metropolitan area in northwestern New Mexico. The study will look not only at television as a means of delivery of the educational program but also at the media preferences of the young adults. The subject matter used will be that of understanding solar energy systems which Edington, Neberay and Keaton, in an earlier study indicated to be one of the major weaknesses in the occupational training program of young apprentices in the southwestern portions of the United States. The subject material was not aimed at the technical skills necessary for installing a solar energy system but at the understanding of how solar energy systems work. In the Edington, Neberay and Keaton study it was pointed out that one of the immediate needs of people in emerging energy occupations was that people in the occupational areas understand the basic principles of solar energy.

A number of steps can be taken to encourage participation in educational programs of young adults. The first step is, of course, greater access. Greater access leads to a consideration of the media of instruction. When considering the use of the media of instruction for facilitating the delivery of such educational programs, several questions immediately come to mind. The most important question concerns people's willingness to use a particular media of instruction. The use of a particular media of instruction may facilitate or deter a person's willingness to participate in an educational program. For example, if in the past a person was unhappy or unsuccessful in an academic situation, a class structured around the lecture may deter

participation because the individual will be unwilling to voluntarily repeat an unpleasant experience (Kronback & Snow, 1977; Travers, 1967).

Instruction broadcast into a user's home provides wide access and minimizes other barriers to instruction such as time, cost, and distance of travel. Easy access of a program on television will increase the probability of participation. In such cases, the medium of instruction may be of little consequence; the major consideration may be the subject or course content.

The literature indicates that at the national level, people who have attained a high educational level, at least some college, are more likely to participate in continuing education programs than are those with less education (OCED, Vol. 4, 1977). Furthermore, it is known that labor union members do not normally participate in continuing education programs (London & Wenkert, 1969).

In a study of manpower training needs for alternative energy sources conducted in New Mexico and Arizona, it was projected that in the next five to ten years, approximately 450 persons will be employed by the solar energy industry in New Mexico (Edington, Keaton, & Neberay, 1977). Furthermore, employers in the construction industries and representatives of building trades expressed a strong desire for more adequate training of workers who would be involved in the construction of solar homes as well as installing and maintaining solar energy systems. A televised series of educational programs was viewed as a possible means of updating the knowledge of workers already employed in solar-related industries. The emphasis in this study was to determine if television is an effective means of providing solar energy information to approximately 15 young adults within a non-metropolitan area of northwestern New Mexico. These apprentices were primarily in their early twenties and were enrolled in a first-year apprenticeship program in sheet metal work.

Another study objective was to determine if media preference leads to higher levels of performance in the acquisition of solar energy principles and procedures. Both printed materials and the audiovisual segments were provided the workers. The printed materials were used first by the non-metropolitan participants, followed by the audiovisual materials. This way, if media preference was influenced by first media contact, bias might be revealed.

After initial exposure, instruction continued in both media, audiovisual and print. Comprehensive tests covering the information from the printed and audiovisual materials were given to both the metropolitan and the non-metropolitan groups. The non-metropolitan group was pretested and asked to study the first three instructional modules entitled, "Using Solar Energy," "Locating the Sun," and "Solar Energy Systems." After one and one half hours, the apprentices were retested. They were then instructed to read the remaining four units at home. At the following meeting the apprentices were shown the first two audiovisual segments. The remaining three segments were shown at the next meeting and the final comprehensive test administered. Because of the restrictions imposed by attempting to collect information under field conditions, the generalizability of these findings will be limited. However, by examining media preference in light of the participant's performance as measured by tests, the study is of value because there will be a reduction in the degree of uncertainty in the decision making process.

A questionnaire was developed to obtain information about the participant's familiarity with the media of instruction. Frequency counts were obtained from the data from the questionnaire. Group means, variances and standard deviations, and minimum and maximum scores were obtained from the aptitude tests, pretests, posttests and final tests. A correlation matrix of all metric variables was computed and the Spearman rank correlation was computed between ordinal values and test scores. A stepwise regression analysis was performed on the aptitude test scores using final test scores as the dependent variable. To determine if media preference helped to explain achievements indicated by the test scores, means and standard deviations were obtained using a one-way analysis of variance. Learning gain was measured by pretest/posttest score differentials; almost all individuals showed a gain in learning. Apprentices had an average pretest score of 14.73 and a posttest of 22.07, showing a learning gain of 7.33. This is indicated in Table 1.

TABLE 1
Means for Test Scores and Mean Learning Gains
on Tests of Printed Materials
Apprenticeship Group

Number	Pretest	Posttest	Learning Gain
15	14.73	22.07	7.33

$$Z = 3.6$$

$$\text{Calculated } Z = \frac{(\bar{Y} - .5) - N/2}{\frac{1}{2} N}$$

would occur by chance only two times out of 10,000.

It is interesting to determine if media preference is associated with learning gain. Previous studies with college students and military personnel have been inconclusive in establishing such association (Campeau, 1974; Nasser & Mc Euen, 1976). The apprentices were asked to indicate a media preference, book or television, but were also given the option of selecting an instructor. Results using posttest and final test scores are shown in Table 2.

TABLE 2

Media Preference
Means and Standard Deviations on Test Scores
for Sheet Metal Apprentices

Dependent Variable	Media Preference						
	Tele- vision	Book	Instructor	Tele- vision with Instruc- tion	Book and In- structor	All Three	Book and Tele- vision
Learning Gain							
n=	4	3	6	1	1	--	--
$\bar{x}$ =	8.75	7.67	6.00	6.00	10.00		
s=	.50	.58	3.79	--	--		
Posttest							
$\bar{x}$ =	22.25	22.67	21.83	20.00	23.00		
s=	2.87	1.15	4.83	--	--		
Final Test							
n=	4	3	6	1	1		
$\bar{x}$ =	41.00	45.00	40.67	25.00	39.00		
s=	9.49	17.52	15.82	--	--		

Face-to-face instruction was generally preferred over either instructional medium or a combination of medium and instruction. On the final test, however, those preferring the book received higher mean scores than those preferring either the audiovisual medium or face-to-face instruction. It should be noted that the greatest learning gain was shown for the subtest preferring television, although the highest scores on the posttest and final test were achieved by those preferring the book.

The apprentices were also asked to indicate the number of hours spent per week reading or watching television. The means for learning gain, posttest and final test scores are shown in Tables 3 and 4.

TABLE 3
Hours of Reading
Means and Standard Deviations on Test Scores

Score		Hours per Week			
		Less than 1	1-5	6-10	More than 10
Learning Gain	n=	1	9	4	1
	$\bar{x}$ =	9.00	8.11	5.75	5.00
	s=	--	2.57	2.87	--
Posttest	$\bar{x}$ =	24.00	22.33	20.50	24.00
	s=	--	2.06	5.74	--
Final Test	$\bar{x}$ =	32.00	39.33	43.75	46.00
	s=	--	12.07	19.29	--

TABLE 4

Hours of Television
Means and Standard Deviations on Test Scores

Score		Hours per week			
		Less than 5	6-10	11-20	More than 20
Learning Gain	n=	6	6	3	
	$\bar{x}$ =	6.83	7.00	9.00	
	s=	2.32	3.03	3.00	
Posttest	$\bar{x}$ =	23.33	20.67	22.33	
	s=	1.03	4.80	2.08	
Final Test	$\bar{x}$ =	45.33	37.83	36.00	
	s=	14.42	11.92	14.93	

The posttest scores here give little information, for the difference in mean scores is negligible. The results suggest that there is an inverse relationship between hours spent reading and hours spent watching television. Furthermore, the data suggests an inverse relationship between hours spent reading and learning gain and the mean score in the final exam. The mean scores on the final test indicated that as the number of hours spent reading per week increases, there is a reverse trend for mean learning gain.

As indicated in Table 4, for time spent watching television, learning gains increase in direct relation to number of hours spent watching television per week. Again, the posttest scores show little variation; however, the means for the final test scores were highest for those who watch the least number of hours per week.

It is interesting to note that a comparison of the data from the non-metropolitan group with a similar metropolitan group showed reverse findings concerning the hours of reading in relationship to the amount of learning.

For the metropolitan group more hours spent reading was directly associated with a greater amount of learning while the opposite was true for the non-metropolitan apprentices in this portion of the study.

Findings

Learning by preferred medium (print or audiovisual) does not appear to lead to greater learning gains. Furthermore, neither previous learning experience with a media nor familiarity with a medium, as judged by time spent in watching television or reading, appear to lead to greater learning with that medium.

It is clear, however, that significant learning can take place using audiovisual or printed learning material, and that for non-metropolitan apprentices in sheet metal programs, television can be an effective means of providing instructional programs. This may be especially important when the young adults are long distances from centers of instruction and instruction can be delivered by a television program.

Recommendations

1. It is recommended that audiovisual materials be used for the dissemination of information about solar energy and comparable technical subjects. In light of the learning gains shown irregardless of media, it would appear that there is no reason not to use an audiovisual approach to the dissemination of information about solar energy. The moderately high interest in these kinds of programs detected by the survey indicates that such programs are marketable. Since these programs are both effective and marketable, cost-benefit considerations should lead educational planners to follow the recommendation.

2. Media selection should be addressed with a view to overcoming reluctance based on past experience. The study of the young adult apprentice sheet metal workers demonstrates that persons who perceive themselves as having done poorly in school can learn from televised instruction. If a means could be devised whereby more persons had the benefit of this kind of successful learning experience, their report of this experience could go a long way toward overcoming negative expectations in other persons who share their life situation.

3. In light of the findings, educational planners must know more about the targeted learners' subjective perceptions about which media they learn best with and how well they did in school. However, this recommendation leads us on to contemplate areas for further needed research.

Further Research

1. Further research is needed to determine whether and to what extent individual learning is affected by the media through which a subject is introduced. This study suggests that certain individuals may respond differently to different types of media.

2. Further research is needed to determine whether, in the case of mixed mode presentations, different orders of media use will produce different results.